ENVIRONMENTAL ASSESSMENT

AND

FEDERAL WATER POLLUTION CONTROL ACT

404 EVALUATION

FOR

MAINTENANCE DREDGING

OF

THE FALL RIVER HARBOR TURNING BASIN

WITH

CONFINED UPLAND DREDGED MATERIAL DISPOSAL

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

AUGUST 1978

INTRODUCTION

The Taunton River navigation channel is essential to efficient waterborne transport (primarily petroleum products) from the Atlantic Ocean to various terminals in Somerset and Fall River, Massachusetts. The channel is maintained by the U.S. Army Corps of Engineers.

A draft Environmental Impact Statement, entitled Fall River Harbor Improvement Dredging Project and Fall River Providence River Harbors, Dredging Actions with Ocean Disposal at Browns Ledge, was sent to the Council on Environmental Quality on 23 March 1976, discussing proposed Federal harbor improvements and maintenance dredging in the Taunton River - Mount Hope Bay Navigation Channel under the jurisdiction of the U.S. Army Corps of Engineers. This project was deferred because of concerns that the concentrations of contaminants in the sediments pose a potential significant adverse impact on the marine environment at the disposal area.

The urgency of performing maintenance dredging in the turning basin above the Brightman Street Bridge caused efforts to be redirected at locating a disposal site for this dredged material. The terms of local assurance for the existing Fall River Harbor project require that the Commonwealth of Massachusetts provide suitable disposal areas for the initial dredging and all subsequent maintenance of the project. Therefore, the Massachusetts Office of Coastal Zone Management investigated disposal alternatives. Of these, the land owned by Montaup Electric Company and located adjacent to the Taunton River, was determined by the Commonwealth in consultation with the Corps to be the only suitable disposal site available. This proposal is to dredge hydraulically the Federal turning basin to the authorized depth of 35 feet, with pipeline disposal on the Montaup property (See figure 1).


N
BORROW AREA
DISPOSAL AREA
Breeds Cove
DREDGING AREA
TAUNTON
RIVER
LEE
RIVER
INTERCHANGE
BRAYTON POINT RD
WILBUR AVE
Drive In Theater
Brightman Bridge
Slades Ferry Bridge
Brayton Point
Brayton Point Beach
Powerplant
Fox Hill
North Burial Ground
Morton Jr High Sch
SEWAMMOCK
BRAGA BRIDGE
6 LANE
4 LANE
OAK GROVE CEMETERY

FIGURE 1

ALTERNATIVES TO THE PROPOSED ACTION

Possible alternatives to the proposed action include no action, and different disposal sites or methods.

No action would allow present delays to navigation, and bottom disturbance, to continue. Continued shoaling could eventually close the turning basin to large ships that commonly transport cargoes to berths at Mountaup Electric Co. and Shell Oil Co. The economic and social damage to local interests could be substantial if these facilities were rendered useless. Such a situation would necessitate a change in existing transportation methods. Smaller ships or barges or pipeline transfer from deeper water could be utilized; however, both would require expensive and potentially hazardous transportation, storage, and rehandling facilities.

The alternative disposal methods considered were:

1. Open water
2. Marsh (shallow water), containment island, or land creation.
3. Unconfined island or shoreline enhancement.
4. Confined land disposal.

The findings reached on analysis of each method are:

1. Open water disposal is not presently a viable alternative because there is no designated site within a reasonable distance of the project area. The time required for site designation would not provide for a site within the time involved in executing the project under other alternatives.

2. These methods would require bulkheading which cannot be funded by the Corps of Engineers according to the Fall River Harbor project authorization. Funding of bulkheading is the responsibility of the Commonwealth or other entities unless specific legislation is enacted by Congress. The absence of enabling legislation and the delays involved in attaining same would not permit the Commonwealth to make available the funding to provide bulkheads on any of several potentially suitable sites.

3. The fine silty material proposed to be dredged is not suitable for unconfined disposal.

4. Confined upland disposal was determined to be the most suitable in response to project needs.

Pursuant to the selection of alternative number 4, investigation by the Commonwealth determined that the Montaup property, a previously used dredged material disposal area was the only suitable site available.

THE PROPOSED PROJECT AND ITS SETTING

Detailed information on commercial background, socio-economic setting, and aquatic ecology of the Taunton River area and project authorization and history was made available in the Fall River DEIS, 1976. The reader of this assessment is therefore referred to that DEIS for detailed information.

In summary, Fall River Harbor is a principal transfer point for petroleum products in this general vicinity. This region is heavily industrialized, and has a substantial population (SMSA population 150,000 in 1970). The aquatic resources of the area have received a heavy pollution load, creating low quality water in the Taunton River - Mount Hope Bay region. Most of the pollution has occured as a result of the introduction of heavy metals and toxic chemicals from industrial plants, and from poorly treated municipal sewage and urban runoff. The Taunton River Quality Index is rated as S-C; these waters are polluted to a degree that water contact and fishing related activities are prohibited or restricted. Nevertheless, the Taunton River serves as a substantial spawing migration route for alewifes, an important commercial fish of this area (See Appendix A - Fish and Wildlife letter, dated April 27, 1977).

The proposed project will involve the removal of an estimated 118,000 cubic yards of sediments from the turning basin of the Taunton River shipping channel to restore the basin to a depth of 35 feet below Mean Low Water. A hydraulic dredge will be utilized to remove the sediments. The dredged material will be pumped via pipeline to a 14.8 acre site located in Somerset, Massachusetts, adjacent to the western shore of the Taunton River, and just north of the Braga Bridge (figure 1).

A dike will be constructed to contain the dredged material. (See figure 2). The disposal area would also receive material dredged from berths at Montaup Electric Co., the Fall River State Pier and New England Power Co. (40,000, 20,000 and 15,000 cubic yards respectively). These other dredging operations would be done subsequent to the Corps' maintenance dredging of the turning basin.

The disposal area was used as a non-confined disposal site for material dredged from the Taunton River in 1950. Field studies of the Montaup property available for disposal (approximately 30 acres) were conducted by Corps of Engineers biologists to identify the vegetation and wildlife of the proposed disposal site. From these studies a specific area within the site was delineated; although categorized as wetlands, it is the area of least environmental quality within the Montaup property, and was therefore recommended as the most desirable site for disposal.

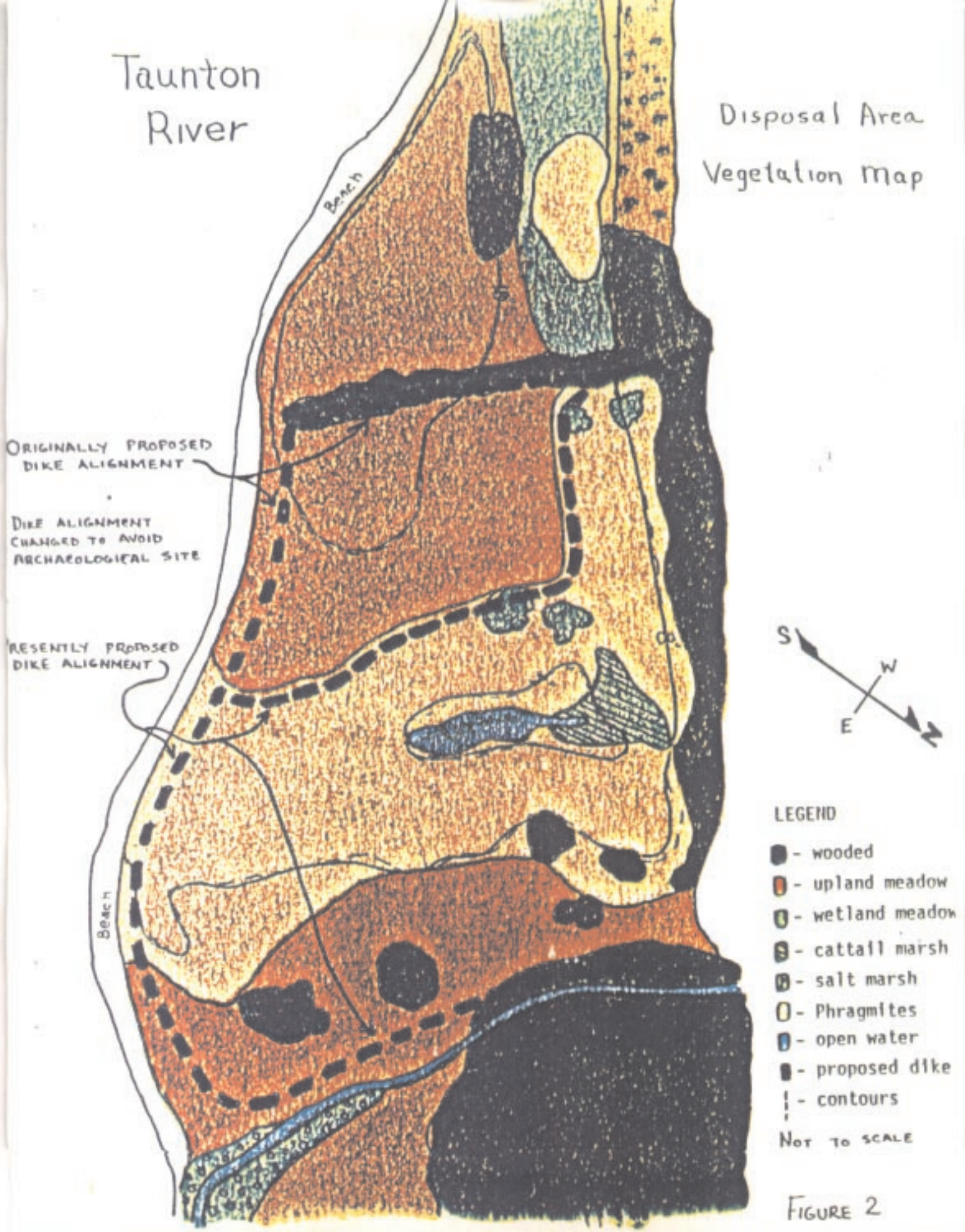
Taunton River
Disposal Area
Vegetation Map
Beach
ORIGINALLY PROPOSED DIKE ALIGNMENT
DIKE ALIGNMENT CHANGED TO AVOID ARCHAEOLOGICAL SITE
PRESENTLY PROPOSED DIKE ALIGNMENT
Beach
S
W
E
N
LEGEND
- wooded
- upland meadow
- wetland meadow
- cattail marsh
- salt marsh
- Phragmites
- open water
- proposed dike
- contours
NOT TO SCALE

FIGURE 2

Other portions (see figure 2) of the area were determined less desirable for disposal for various reasons. The SW portion of the area is a natural wetland, classified as freshwater meadow. This area is separated from the Taunton River by a hill, which represents a fine, undisturbed example of a coastal upland meadow. The area NE of the disposal area is bounded by a stream-forest and an upland meadow and a small salt marsh near the river. All of these areas represent much higher quality environments for wildlife and enhance productivity of the area. Further, the upland meadow was found through Corps investigation to be an archaeological site. Therefore, the disposal area will be diked and contained within an area of least environmental quality. In comparison to the rest of the 30 acre site, the phragmite marsh and small pond that would be buried by disposal operations serve a less useful purpose, except perhaps as cover and resting for some waterfowl and muskrat.

A list of plant and animal species in and near the disposal site was compiled by Corps biologists and is provided in Appendices B&C respectively. Spatial distribution of the various vegetation complexes and wildlife habitats can be best determined through examination of figure 2.

The land surrounding the proposed disposal site is not intensively developed, despite its accessibility and the high intensity of development across the river in Fall River, Massachusetts. The Somerset waste treatment plant is located upstream of the proposed disposal site. About 30-40 acres of forested land separates the site from residential areas about 1,000 yards inland. A near-shore residential area, Brayton Point Beach area, is on the other side of a 4 lane controlled access highway about 1,000 yards downstream from the proposed disposal site. The Montaup land is zoned for industrial use and Montaup Electric Co. has planned to utilize the site for construction of a new electric generating station within the next 25 years.

PROBABLE ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Aquatic Impact

Aquatic impacts of the dredging activity would relate primarily to physical disruption of the bottom sediments. The most direct effects would be destruction of slow moving or immobile organisms from displacement by the dredge and smothering from some settling of suspended sediments nearby. Increased turbidity near the dredge site and the disposal area discharge point would occur, but the associated problems would be short term and of little significance.

The most likely, significant impact would be a distraction of the annual Alewife spawning run which usually occurs in early spring. At the request of the State the effluent from the disposal area will be discharged at a depth of 15 feet at mean low water during the period of 15 March through 31 May to mitigate any such impact which might be created by a turbidity plume.

Less direct, yet possibly more severe and widespread impacts may result from dissipated exposure of the dredged material in the water and resultant release of various contaminants that have collected in the sediments and the aquatic system. This could be possible directly at the dredging site, and from the effluent draining from the disposal area.

Corps biologists believe that aquatic impacts of this project will be insignificant because of the dilution afforded by the Taunton River - Mount Hope Bay aquatic system. A more detailed discussion of potential contamination is provided in Appendix D,"Expected Types and Magnitude of Aquatic Contamination."

Terrestrial Impacts of Disposal

All vegetation and slow moving or immobile organisms within the disposal site would be destroyed by burial. The relative quantities and types of biota thus affected can be derived from examination of the vegetation map (page 8) and wildlife and vegetation species lists in the appendices B&C. None of the fauna or flora identified in the disposal area are known to be on any rare or endangered species lists.

The disposal area is primarily covered by a "forest" of Phragmites which is of little value to wildlife. The better wildlife areas of the Montaup property would be left undisturbed. The small pond (approximately 1 acre) in the center of the Phragmites area would be filled in by the dredged material and would no longer be available to the waterfowl and muskrat that utilize the habitat afforded by the open water and small cattail marsh.

Due to the fineness of the materials to be dredged, it would probably be

several years before the dredged material would be sufficiently dewatered, and the saline concentrations low enough to permit revegetation and allow the land to again be useful as wildlife habitat. This time frame could be shortened by utilizing post-deposition dewatering techniques and introducing plant species adaptable to the resultant soils as quickly as possible.

Socio-Economic Impact

Economic benefits will be accrued by more efficient waterborne commerce, particularly to Shell Oil Co., the Fall River State Pier, and Montaup Electric Co. Without the project, declining shipments to these facilities would result in loss of jobs in the general area as well as increased costs of the products provided by these facilities unless alternative transport means are developed.

For several years (until revegetated) the disposal area would present an unsightly setting; and during disposal operation an unpleasant odor may be emitted by anaerobic decomposition of organic compounds in the dredged material.

Effects on Present Land Use and Cultural Resources

Shoreline property in the Taunton River - Mount Hope Bay region is zoned primarily for industrial and commercial business purposes. Waterfront land now used by industries that require use of the turning basin would continue to be used for commerce that requires deep draft shipping since maintenance of their berths is anticipated to coincide with the proposed turning basin maintenance.

The disposal site is also the proposed future site of another Montaup Electric Power Plant.

A Corps of Engineers cultural resource reconnaissance and intensive survey of the proposed disposal area identified a prehistoric archaeological site. The site has been determined eligible for inclusion in the National Register of Historic Places. The final design insures preservation of this resource. The containment dike for dredged material has been aligned to exclude the site from the disposal area (Figure 2). As diking material was originally proposed to be obtained from the archaeological site area, it was necessary to find an alternate source of material. The material now proposed to be used is entirely from previously disturbed fill areas (See figure 1). This impervious material would be utilized for the section of dike facing the archaeological site area. This would prevent lateral seepage to the site from the disposal area which might have affected the archaeological site area. These design changes and implementation measures would avoid any forseeable project impacts upon the site.

CONCLUSIONS

Upon evaluating the information presented in this assessment, it is my belief that hydraulic maintenance dredging of the Fall River Harbor turning basin with land disposal via pipeline as described herein is in the best public interest.

Although the material to be dredged contains potential contaminants, water quality impacts should be insignificant because of the dilution afforded by the Taunton River - Mount Hope Bay aquatic system.

The disposal at an upland site will not adversely affect any land use plans or have any major terrestrial ecological impacts.

In my evaluation, this assessment has been prepared in accordance with the National Environmental Policy Act of 1969 and will be coordinated with appropriate regulatory agencies. This assessment precludes the need for preparation of a formal Environmental Impact Statement.

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

25 August 1978
(Date)

THE FEDERAL WATER POLLUTION CONTROL ACT

SECTION 404 EVALUATION

FOR

MAINTENANCE DREDGING

OF THE

FALL RIVER HARBOR TURNING BASIN

FALL RIVER, MASSACHUSETTS

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

AUGUST 1978

INTRODUCTION

This report is intended to provide an evaluation of the proposed maintenance dredging of Fall River Harbor Turning Basin with upland disposal of dredged sediments. This evaluation is in conformance with Section 404 of the Federal Water Pollution Control Act of 1972 (FWPCA), amended as the Clean Water Act, December 27, 1977. The purpose of this Act is to provide a means of protecting vital national water resources from despoilation through irresponsible and irreversible decisions and actions. This evaluation should therefore provide information sufficient to determine whether unacceptable or unnecessary degradation of such values would result from project implementation.

Application and administration of the 404 requirements are assigned to the Administrator of the Environmental Protection Agency (EPA) and the Secretary of the Army. Guidelines for the evaluation were published by the EPA in the Federal Register, September 5, 1975 (40 CFR 230). Pursuant to a recent Corps of Engineers regulation (ER 1105-2-XXX; draft, dated October 1, 1977), these guidelines are to be applied in evaluation of all Corps of Engineers activities involving discharge of dredged or fill material in navigable waters. This proposed dredging project does involve "discharge of dredged material" in "navigable waters"* Any impacts to the specific items addressed by the EPA guidelines that would result from disposal of the dredged material are therefore addressed in this report.

The EPA guidelines are applicable, particularly in relation to wetlands, water supply, fishery resources, and wildlife and recreational values. The intent of the guidelines is to provide an ecological evaluation of such aspects (section 230.4) and relevant consideration and conditioning of the discharge (section 230.5) to minimize or prevent unnecessary degradation. ER 1105-2-XXX specifies that evaluation analysis and findings shall be presented so that reviewers may easily locate each of the points listed in section 230.4 and 230.5. This evaluation is intended to fulfill this specification.

The environmental assessment of this project concluded that impacts do not warrant preparation of an Environmental Impact Statement. The assessment contains additional information regarding various water resource impacts and is appropriately referenced in this evaluation.

*See Appendix E for specific definitions per EPA guidelines.

PROJECT DESCRIPTION

The proposed project consists of dredging the Fall River Harbor Turning Basin to a depth of 35 feet. This will involve removal of approximately 118,000 cubic yards of sediment by a hydraulic dredge. These sediments will be mixed with water by the dredge and pumped via pipeline to the upland disposal site about 2 miles downstream.

The disposal site will be a 14.8 acre area contained by 10 ft. high dikes which will have an elevation of 19 ft. above mean low water. Some of the dike material will come from within the disposal site and some will be brought in from a borrow area. For spatial reference of the components of the project and various alternative disposal sites, please refer to Figure 1 of the environmental assessment. A more detailed project description and its setting is also provided in the assessment (pgs.4 -6).

FWPCA
SECTION 230.4-1

A TECHNICAL ECOLOGICAL EVALUATION

230.4-1 (a) Physical Effects

Physical effects on the aquatic environment primarily include destruction of wetlands, impairment of the water column, and covering of benthic communities. Evaluation of the significance of physical effects are based on the extent of the discharge area and which related values of the environment are displaced or affected by the proposed discharge. The following is a short explanation of how such physical effects are related to this dredged material disposal project, as outlined per the EPA guidelines.

230.4-1 (a-1) Effects on Wetlands: According to the EPA guidelines, from a national perspective, the degradation or destruction of wetlands is the most severe environmental impact covered by the 404 guidelines. Such destruction is regarded as an irreversible loss of a valuable aquatic resource. Briefly, such values, as specified in the EPA guidelines (quotations hereinafter), would apply to this project as follows:

> (i) "wetlands that serve important natural biological functions, including food chain production, general habitat and nesting, spawning, rearing and resting sites for aquatic or land species....". This project would displace approximately 10 acres of wetlands. However, it is the judgement of Corps biologists that the wetlands displaced by this project are less biologically significant than other feasible sites within the given area. This is explained on pages 4 - 6 of the environmental assessment.
>
> (ii) "wetlands set aside for study of the aquatic environment or as sanctuaries or refuges..."

No such areas would be affected by this project.

> (iii) "wetlands contiguous to areas listed in (a) (i) and (ii) of this section, the destruction of which would affect detrimentally the natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics of the above area..."

Adjacent to the disposal site are other wetlands. These were considered valuable by Corps biologists and were for this reason recommended to be left undisturbed by the disposal operation. This was the main rational for delineating the proposed disposal site - an area of least environmental value within the given tract of land. Except for the displacement of the existing "edge" of the existing wetland, the disposal operations should not affect the adjacent wetlands.

> (iv) "wetlands that are significant is shielding other areas from wave action, erosion or storm damage. Such wetlands often include barrier beaches, islands, reefs and bars...".

The disposal site does not significantly serve such functions.

> (v) "wetlands that are prime natural recharge areas... where surface and ground water are directly interconnected...".

The disposal site is a ground water discharge area.

230.4-1 (a-2) Effects on the Water Column: The "water column" of the disposal area will be displaced by the dredged material.

230.4-1 (a-3) Effects on Benthos: The benthos of the disposal area will be destroyed.

230.4-1 (b-1) Evaluation of Chemical-Biological Interactive Effects: The sediments to be dredged have been analyzed and found to contain various contaminants capable of such effects (see tables 1 and 2 in Appendix D).

230.4-1 (b-2) Water Column Effects: Examination of the sediment bulk analysis and elutriate test results indicate a potential for release of nutrients, heavy metals, PCB's and organic materials from the sediments. Most of such contaminants would stay within the contained disposal area; however, some may be released back into the river with the overflow from the disposal area. Dispersion and dilution of the effluent in the river will reduce the potential of detrimental biological effects. (See Appendix D)

230.4-1 (b-3) Effects on Benthos: Because of the precaution taken to minimize release of excessive contaminants into the river, no significant effects on benthos are expected. Although areas of some quohaug productivity are found in the vicinity of the disposal site, shellfishing for human consumption is prohibited due to the existing contamination of the river waters.

230.4-1 (c) Comparison of Sites: This action does not involve open water disposal; therefore, comparison of sediments at dredging and disposal sites is irrelevant.

230.4-2 Water Quality Considerations

The Taunton River in the vicinity of the proposed dredging and disposal operations is classified as S-C; these waters are polluted to a degree that human contact and fishing for consumption are prohibited. The water quality effects of the effluent from the disposal site should be negligible.

230.5 Selection of Disposal Sites and Conditioning of Discharge of Dredged or Fill Material

230.5 (a) General Considerations and Objectives: Consideration of the following objectives relate to the proposed discharge as follows:

(1) Although the disposal site is directly connected to an aquatic ecosystem, disposal will not significantly disrupt the chemical, physical, or biological integrity of the aquatic ecosystem, because of the confining dikes.

(2) The disposal site does not present significant productivity - the predominant vegetation is Phragmites, a reed not utilized for food by any important animal species.

(3) The disposal operation should not inhibit significant movement of fauna.

(4) The wetlands at the "disposal site" do not function as maintenance of water quality. The water quality within the disposal site is very poor due to having a substrate of highly organic, silty, dredged material.

(5) The disposal site does not function to retain natural high flood waters.

(6) Adverse turbidity levels from the disposal site will be minimized by allowing settlement of the sediments before excess water overflows into the Taunton River.

(7) The disposal area is not used for recreation, nor will economic values be degraded. An aesthetic impact would result to any persons viewing the site from the west, i.e., Interstate 195 and the Braga Bridge.

(8) Unnecessary water quality degradation would be avoided.

230.5 (b) Considerations Relating to Degradation of Water Uses at Proposed Disposal Sites:

(1) There are no municipal water intakes near the proposed disposal site.

(2) Shellfish Considerations:

(i) The disposal site is not in an area of concentrated shellfish production. Further, the disposal area effluent would be piped away from shore, where some quohaug populations, although limited, do exist.

(ii) Pollutants from the disposal area would be sufficiently diluted and obscured by river contaminants to prevent possible contamination of shellfish beds.

(iii) Use of the disposal area would not change current, salinity, or flushing rates that may affect shellfish.

(iv) The limited shellfish production near the disposal area does not warrant protection by scheduling the dredging and disposal activity to avoid shellfish reproductive periods.

(3) Fisheries:

(i) The disposal area is not near significant fishery spawning or nursery areas.

(ii) Dredging and disposal operations would be conducted to minimize interference with fish spawning cycles and to minimize interference with migration patterns and routes. (Appendix A).

(iii) The largest portion of the disposal site is Phragmites, an emergent vegetation.

(4) The specific delineation of the disposal site was made to minimize wildlife impacts to the area (see assessment, pgs. 4 - 6).

(5) The proposed disposal site is not in or near a designated recreation area.

(6) No rare or endangered species, nor habitat thereof, were identified in surveys of the disposal area (See Appendices B & C).

(7) Damage to benthic life at the disposal site is considered to be insignificant.

(8) Wetlands:

(i) Wetland disposal should be allowed only as a "least environmentally damaging alternative". The area, which was provided by the Commonwealth of Massachusetts, is described on pages 4-6 of the environmental assessment and figure 2. The feasibility of other methods of disposal are discussed on page 3 and in Appendix E. Within the 30 acre selected area, the site of disposal (14.8 acres) was determined by Corps biologists to be the least environmentally valuable portion of the area. Other feasible locations that may have also served as disposal sites are not available for use by the Corps. It was also determined that the displacement of the wetland, which was formed within an old uncontained dredged material disposal site, would not constitute an unacceptable adverse impact on the aquatic resources.

(ii) The following demonstrates the reasons for recommending disposal in the wetland site;

(a) Other sites are not available or would be more environmentally damaging; and,

(b) The proposed fill will not cause a permanent unacceptable disruption to the beneficial water quality uses of the affected ecosystem. In fact, if properly managed once disposal is completed, the area could be improved to provide an environment that would enhance the surrounding habitats.

(9) Submersed Vegetation at the disposal site is not of significant biological productivity. The area is predominantly Phragmites. Nearby wetlands do contain more productive species, but these have been avoided in delineation of the disposal site.

(10) The disposal site would be contained within 10 ft. high dikes. Attempting to decrease the area within which the dredged material could be placed would further reduce the economic feasibility of this method.

230.5 (c) Considerations and Conditions that Minimize the Possibility of Harmful Effects:

(1) Contained disposal would be utilized as opposed to open water disposal; and

(2) Conditions to minimize effects of overflow from the disposal site have been provided in project design.

230.5 (d) Contaminated Fill Material Restrictions: The disposal area will be operated to provide retention of the dredged sediment and reduce turbidity in the effluent. The effluent pipe will discharge beyond the more productive shoreline communities.

230.5 (e) Mixing Zone Determination: The runoff from the disposal site may produce a noticeable "zone" of turbidity or contamination. However, the volume of runoff should be adequately diluted and dispersed from the point of discharge to minimize adverse effects.

CONCLUSION

It is the responsibility of the Corps of Engineers, NED, to maintain the Federally authorized Fall River Harbor Turning Basin. It is also the responsibility of the Corps, in accordance with the National Environmental Policy Act and the Water Pollution Control Act, to investigate and present those effects associated with the project that impact the human environment and water resources--and, where possible, minimize detrimental impacts. Various concerns regarding such impacts have resulted in the Corps proposing the project as described in this evaluation to avoid more unacceptable environmental impacts, yet accomplish the most critically needed maintenance of the navigation channel.

This final project design is the result of intensive efforts by Federal and State concerns to locate and design a suitable disposal site. The project has been designed to minimize adverse environmental effects to the aquatic ecosystem.

It is my conclusion through review of the 404 evaluation that impacts and objectives of concern, as outlined by the EPA Guidelines (40 CFR 230), have been clearly identified in this report and considered in the project specifications. The proposed disposal method has been determined, within institutional, economic, and engineering constraints, to be the most suitable alternative to accomplish maintenance of this economically important navigation project.

25 August 1978
Date

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

APPENDICES

A - Coordination

B - Plant Species List

C - Animal Species List

D - Expected Types and Magnitude of Aquatic Contamination

E - Definition of Terms

APPENDIX A

COORDINATION

Throughout the planning of this project, extensive coordination between the Corps and various Federal, State and Local concerns has ensued. Much of this coordination has been responsible for arriving at the proposed project plan.

Included in this Appendix is a collection of communication from the following concerns:

The United State Department of Commerce,
National Marine Fisheries Service

The United State Department of the Interior,
Fish and Wildlife Service

The Commonwealth of Massachusetts,
Office of Environmental Affairs
Office of Massachusetts Historical Commission
Division of Marine Fisheries
Executive Department

The Town of Somerset, Massachusetts Conservation Commission

The Commonwealth of Massachusetts
Department of Fisheries, Wildlife and Recreational Vehicles
Division of Marine Fisheries
Leverett Saltonstall State Office Building
100 Cambridge Street, Boston 02202

October 31, 1977

Mr. Eric Van Loon, Director
Office of Coastal Zone Management
100 Cambridge Street
Boston, MA 02202

Dear Mr. Van Loon:

The Division of Marine Fisheries has received a copy of Secretary Murphy's status report on the Fall River Maintenance Dredging Project. The Coastal Zone Management staff is to be complimented in resolving this long-standing problem.

It is noted in the third paragraph of the memorandum to the Development Cabinet that the Corps of Engineers will coordinate efforts relative to design and timing of the operation so that they will be agreeable to the Division.

As you may or may not know, the Taunton River supports one of the largest alewife runs in the Commonwealth. The Division has spent considerable time, money, and effort in the restoration of alewife to this drainage system. Principally, through the construction of new fishways and modification of existing fishways, a total of 5,000 acres of spawning area has been made accessible for alewife reproduction.

In order to fully protect this important anadromous fish resource, the Division strongly recommends that no dredging be conducted in the Taunton River from March 15 through May 30 inclusive.

If you have any questions about this recommendation, please do not hesitate to contact me.

Very truly yours,

Allen E. Peterson, Jr.
Director

WLB/jmv

cc: Secretary Murphy
Gordon Beckett US F. & W. S.
Marvin Boussu N.M.F.S.
Thomas McMahon, Director
M.D.W.C.
John Hannon M.D.W.
Madeleinne Kolb M.E.P.A.
Sharon Alexander C.Z.M.

A-1

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
P. O. Box 1518
Concord, New Hampshire 03301

January 24, 1978

Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

This is our report on your plans to perform maintenance dredging of the Fall River Harbor Federal Navigation project, as described in Mr. Andreliunas' letter of December 27, 1977. It is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The existing Federal navigation project was authorized in 1930. The authorized project provides for a channel 40 feet deep and 400 feet wide in the Taunton River extending from deep water in Mount Hope Bay to the turning basin between the Shell and Montaup Wharves about one mile upstream of the Brightman Street Bridge.

Because of the postponement of the work that was to have deepened the project to 40 feet, attention has been focused on maintenance dredging the turning basin to the previously dredged depth of 35 feet. It is estimated that 118,000 cubic yards of black organic silt will be removed hydraulically and will be pumped onto an upland site.

The proposed disposal site is located on the northwest shore of the Taunton River just upstream of the Braga Bridge. The disposal site is owned by Montaup Electric Company and is also proposed to be used for the disposal of sediment dredged from berthing areas of Montaup Electric (40,000 cubic yards), New England Power Company (5,000 cubic yards), and the State pier (15,000 cubic yards.)

A large part of the disposal site has been previously used as a dredged material disposal area. The remaining portion is an abandoned field undergoing the primary stages of succession. It appears that spoil in the formerly used disposal site was not spread or did not settle to an

even level. As a result there exists a small cattail and open water wetland within the boundaries of the site. This wetland provides excellent wildlife habitat and should remain intact.

A large borrow pit or depression occurs to the northwest of the old railroad bed which forms the northwest boundary of the proposed disposal area. The use of this depression for spoil disposal would prevent the destruction of the previously described wetland.

One other concern is in regard to the scheduling of the dredging. It is known that dissolved oxygen levels in the Taunton River area reach very low levels during summer. Resuspension of bottom sediments during dredging could further reduce dissolved oxygen levels and possibly adversely affect fish species in the area, particularly juveniles. Scheduling dredging to avoid the period of naturally low oxygen levels (usually July and August) would help alleviate this problem.

Therefore, in addition to the conditions agreed to in response to recommendations of the State of Massachusetts (1. No dredging from March to May 31 to avoid adverse impacts on the alewife run; and, 2. Extension of the effluent pipe out into the river to mitigate any turbidity effects on shellfish in shallow water), we recommend:

1. A spoil site that will not involve filling wetlands be used.

2. The dredging not be done in July or August.

Sincerely yours,

Vernon B. Lang
Acting Supervisor

A-3

RICHARD E. KENDALL
COMMISSIONER

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Management
Leverett Saltonstall Building, Government Center
100 Cambridge Street, Boston 02202

February 2, 1978

Mr. V.L. Andreliunas
Chief, Operations Division
New England Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02202

Dear Mr. Andreliunas:

Your letter of January 16, 1978 seeking comments on the Fall River Harbor maintenance dredging project has been reviewed by this Departments' Division of Water Resources.

We approve the proposal in the belief that it has been adequately designed to minimize adverse effects upon fin and shellfish. The disposal of polluted materials in the designated location and in the proposed manner appears to be the best solution currently available.

It is our understanding that the disposal site may be utilized for the disposal of dredged materials from other projects. It is our hope that the disposal method will prove to be a relatively harmless solution to a vexing problem.

A program of monitoring, and perhaps the dedication of the site to some long-term beneficial use, are not discussed in the material forwarded to us. It is our sincere belief that such monitoring could make this a valuable demonstration project. This Department would be willing to participate in providing advice concerning the restoration of the site in terms of suggesting materials for revegetation.

While we believe this agency's views are generally supported by those of other state agencies, we must point out that a large degree of jurisdiction over this project is contained in the statutory authority of the Department of Environmental Quality Engineering.

Very truly yours,

Richard E. Kendall

Richard E. Kendall
Commissioner

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Federal Building, 14 Elm Street
Gloucester, Massachusetts 01930

February 6, 1978

Colonel John P. Chandler
District Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Chandler:

We have reviewed your letter of December 27, 1977, and Public Notice NEDOD-N dated January 30, 1978, concerning maintenance dredging of the Fall River Harbor Federal Navigation project at Fall River, Massachusetts.

Project plans call for dredging the turning basin to its previously dredged depth of 35 feet (creating approximately 118,000 cubic yards of spoil material) and to dredge berthing areas at Mantaup Electric (40,000 cubic yards of spoil), New England Power Company (5,000 cubic yards of spoil), and the State Pier (15,000 yards of spoil).

The disposal site is located upland, on the northwest shore of the Taunton River just upstream of Braga Bridge. A large portion of the disposal site has been previously used as a disposal area for dredge spoil. The remaining area appears to be an abandoned farm field. While we have no objection to the use of this area as a disposal site, we do question how this site was chosen. Specifically, a large depression occurs to the northwest of the old railroad bed which is adjacent to the proposed disposal ground. This area appears to be better suited as a disposal area for the proposed project. We would appreciate understanding why this site was not chosen.

Further, because the Taunton River supports one of the state's largest anadromous fish populations of alewife, we recommend that no dredging be conducted between March 15 and March 31. Also, the dissolved oxygen levels in the Taunton River reaches low levels during summer months. Resuspension of bottom sediment during dredging could further reduce dissolved oxygen level and adversely impact fishery resources. In order to avoid any possible impact on fisheries, we recommend that dredging during periods of low oxygen levels be restricted. Low oxygen periods usually occur during July and August.

Sincerely,

A-5

William C. Gordon
Regional Director

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
P. O. Box 1518
Concord, New Hampshire 03301

(15)

February 13, 1978

Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

This is in respone to Public Notice NEDOD-N dated January 30, 1978, concerning the maintenance dredging of the 35-foot turning basin in the Fall River Harbor Federal navigation channel. We submitted a Fish and Wildlife Coordination Act report on this project on January 24, 1978. In that report we recommended (1) a spoil site that will not involve filling wetlands be used, and (2) the dredging not be done in July or August. These recommendations were in addition to the conditions already agreed upon in response to recommendations of the State of Massachusetts. We wish to reiterate these recommendations.

Please keep us informed of your progress towards locating a suitable spoil disposal site and rescheduling the project.

Sincerely yours,

Gordon E. Beckett
Supervisor

A-6

PAUL GUZZI
Secretary of the Commonwealth

The Commonwealth of Massachusetts
Office of the Secretary
Massachusetts Historical Commission
294 Washington Street Boston, Massachusetts 02108
(617) 727-8470

February 17, 1978

Mr. John P. Chandler
Colonel, US Army Corps of Engineers
Division Engineer
424 Trapelo Road
Waltham, Mass. 02154

Re: NEDOD-N, Maintenance Dredging, Somerset, MA

Dear Colonel Chandler:

The Massachusetts Historical Commission (MHC) has reviewed the public notice regarding maintenance dredging in Fall River Harbor and has the following comments. The proposed disposal area is located on top of a known prehistoric archeological site and is therefore a sensitive cultural resource area. It is our understanding from consultation with John Wilson of the Corps' environmental branch that an archeological reconnaissance survey and an intensive survey have been undertaken of the project disposal area. The MHC commends the Corps of Engineers' concern for archeological properties and looks forward to receiving the archeological survey reports shortly. The Advisory Council Procedures (36 CFR 800) should be implemented before a determination of effect is made.

Sincerely yours,

Elizabeth Reed Amadon

Elizabeth Reed Amadon
Executive Director
State Historic Preservation Officer
Massachusetts Historical Commission

ERA/SCH/ed

A-7

MICHAEL S DUKAKIS
GOVERNOR

EVELYN F MURPHY
SECRETARY

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

April 27, 1977

Colonel John Chandler, Division Engineer
New England Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Chandler:

My Office has recently done extensive site investigation and coordination with possible recipients of the proposed Fall River maintenance dredge material.

We have contacted Montaup Electric Company regarding their waterfront site just north of the Braga Bridge. Montaup has indicated willingness to negotiate for the use of this site. However, the site is largely fresh-water wetland, restricted from development by the local (Somerset) Conservation Commission. It is our feeling that this site provides a possible disposal option if used in conjunction with mitigative measures which would enable this area to continue to function effectively as a flood and erosion buffer.

During the course of our investigations, several other possible disposal options were uncovered, which offer to our mind, perhaps better disposal opportunities. These sites have not been approached by the Corps. The first is at Battleship Cove. The second, Crab Pond, part of the State Pier complex. Both facilities are looking for fill as part of their projects. They require only that such fill be stable enough to allow construction of parking lots and roads. Battleship Cove has 5-6 acres of land plus water-front which will require bulkheading, this last is included in the design plans already formulated. Crab Pond has 7.2 acres. Both of these projects are still in the basic planning phase.

It has been suggested by Dr. Philip Gidley that a mixture of 10% flyash with the very fine maintenance dredge material would allow such compaction and stabilization. Tests conducted on very clayey material combined with flyash have yielded excellent results, though no tests have yet been conducted with dredge spoil.

The Tibbetts Engineering firm of New Bedford, consultants to the Battleship Cove Commission, have asked that such tests be performed in the form of simple consolidation tests. Tibbetts would be interested in conducting the tests, should the Corps wish to contract that work out. Provided these trials show promising results, actual timing of dredging and disposal operations would have to be arranged between the Army Corps of Engineers and the respective individual facilities.

One other possible alternative was noted in the course of field investigation by this Office, i.e. the small cove directly to the north of the Shell Oil storage tanks and the larger cove directly to the south. Use of these areas, due to their location and nature, might allow more simple disposal procedures, such as bulkheading only, without extensive dewatering efforts. If feasible, this site might offer the Corps its most expedient solution to the immediate dredging needs.

My Office has not, as of this time, received any written discussion from your Office regarding either the above noted sites or several other areas which we understand have been previously evaluated and rejected by Corps engineering staff. Since I am quite concerned that an acceptable means of disposal for the maintenance dredging be found as soon as possible, I am requesting that such written discussions be forwarded to Sharon Alexander of my Coastal Zone Management staff. My Office will continue to search actively for a reasonable solution to this issue.

Very truly yours,

Evelyn F. Murphy
Secretary of Environmental Affairs

EFM:SRA:sar

The Commonwealth of Massachusetts
Office of the Secretary
Massachusetts Historical Commission
294 Washington Street Boston, Massachusetts 02108
(617) 727-8470

COPY

Secretary of the Commonwealth

May 9, 1978

Colonel Boivin
Division Engineer
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Re: U.S. Army Corps Dredging, Fall River Harbor, Somerset, MA

Dear Colonel Boivin:

MHC has reviewed the archaeological report prepared for the above referenced project, and has also attended several meetings to discuss possible mitigation alternatives.

MHC feels that the proposed dredging and disposal project will have "no effect" (36 CFR 800) on historic properties listed or eligible for the National Register of Historic Places provided that the following conditions are met. The conditions are:

(1) The site labelled area "A" in the archaeological report prepared by the Institute for Conservation Archaeology, Harvard University will be avoided. Neither dumping of dredge spoils nor construction activity will take place on the site.

(2) The dike separating area A from the spoils area will be built on the same line as the old dike listed both in the archaeological report and in the Operations Divisions maps.

(3) The new dike will be lined with impervious material, of a type to be agreed upon by MHC so that no leachate from the spoils area will seep back into the area of the prehistoric site located in area A.

(4) The Army Corps will attempt to avoid further publicity concerning the nature of the cultural resource present in area A in order to protect the site from casual collectors.

MHC requests an opportunity to review and comment upon the final construction plans and specifications. If the MHC can be of further assistance, please contact

Valerie Talmage, Staff Archaeologist.

Sincerely,

Patricia Weslowski
State Historic Preservation Officer
Acting Executive Director
Massachusetts Historical Commission

SCH/vt

xc: Fran Donovan, U.S. Army Corps of Engineers
John Wilson, U.S. Army Corps of Engineers
Sharon Alexander, CZM
Larry Feldman, MEPA
Montaup Power Company
Tenny Lantz, OSP

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Federal Building, 14 Elm Street
Gloucester, Massachusetts 01930

July 25, 1978

Col. John P. Chandler
Division Engineer
Department of the Army
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Chandler:

We have reviewed Public Notice No. NEDOD-N, dated July 7, 1978, concerning maintenance dredging of the Fall River Harbor Federal Navigation project at Fall River, Massachusetts.

We submitted our comments to you concerning this project in a letter dated February 6, 1978 (copy enclosed). Our concerns and recommendations remain the same. However, we no longer have questions about why the disposal site was chosen. Telephone communication between our respective staff members has resolved this issue.

Sincerely,

for William C. Gordon
Regional Director

Enclosure

A-12

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P. O. BOX 1518
CONCORD, NEW HAMPSHIRE 03301

August 2, 1978

Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

This is in response to Public Notice NEDOD-N, dated July 7, 1978, concerning your plans to maintenance dredge a portion of the Federal navigation project in Fall River Harbor, Massachusetts. We submitted our Fish and Wildlife Coordination Act report on this project to your agency on January 24, 1978. On February 13, 1978, we responded to your public notice of January 30, 1978. In that correspondance we recommended, in addition to already agreed upon conditions, that:

1. A spoil site that will not involve filling wetlands be used.

2. The dredging not be done in July or August.

We still submit that the proposed disposal site is unsatisfactory. We believe the use of the site will violate the spirit and intent of President Carter's Executive Orders of May 24, 1977, concerning the protection of wetlands, and floodplain management as well the Corps' environmental policies, objectives, and guidelines published in the October 29, 1976, Federal Register. We feel that the adjacent borrow pit is a suitable site for spoil disposal. We are willing to assist in the location of a suitable spoil disposal site and hope that you will get back to us soon in an attempt to locate one.

We understand that because of delays in project scheduling the project will not be done in July or August this year. Presumably a non-wetland disposal site will be found and the project can be completed before next spring's alewife spawning run (March 15 - June 15).

Therefore, we recommend:

1. Spoil from the dredging not be deposited on wetlands.

2. Work be completed before March 15, 1979; and

3. If the project is to proceed, a concerted effort be made to locate a suitable spoil site.

Sincerely yours,

Vernon B. Lang
Acting Supervisor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT
STATE HOUSE • BOSTON 02133

MICHAEL S DUKAKIS
GOVERNOR

August 4, 1978

Colonel John Chandler
Division Engineer
New England Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Chandler:

May I commend you and your staff on the exceptional fortitude you have shown in pursuing the accomplishment of the dredging of the Taunton River turning basin and associated private docking berths. The task has been fraught with problems from its inception and I have closely followed the process of resolution of each issue as it has arisen. As you know, I have designated the maintenance dredging of Fall River as a priority economic development project of this Administration. Therefore, I am most pleased to forward to you the attached letters from the Office of Coastal Zone Management and the Division of Water Pollution Control within the Executive Office of Environmental Affairs, and from the Massachusetts Historical Commission. Please accept these letters as my official endorsement of the proposed project in its latest revised form.

Sincerely,

Michael S. Dukakis
Governor
Commonwealth of Massachusetts

MSD:SRA:sar

A-15

COASTAL ZONE
MANAGEMENT

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

August 4, 1978

Vyto L. Andreliunas, Chief
Operations Division
New England Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Andreliunas:

The Office of Coastal Zone Management has reviewed your proposal to hydraulically remove approximately 118,000 cubic yards of material from the Taunton River turning basin in the Fall River Harbor, with disposal at a nearby land site in Somerset.

In accordance with its designated role as coordinator for federal dredge project reviews within the Massachusetts Executive Office of Environmental Affairs (EOEA), this office offers the following comments, recommendations, and conditions based upon the concerns of the Department of Fisheries, Wildlife and Recreational Vehicles, the Department of Environmental Quality Engineering, the Department of Environmental Management, and the Office of the Secretary of Environmental Affairs.

The final project as proposed represents the result of two years of intensive efforts to both locate and design a suitable land disposal site as an alternative to ocean disposal, and then to arrange such timing and drainage mitigations as to minimize biological impacts at the dredging and disposal sites. As a result of tremendous coordinative energies between this office, your staff and a host of other federal, state and local agencies, this Office is pleased to support the project as it is now proposed. In order to allow this critical project to be implemented, a multitude of environmental issues have had to be addressed, evaluated and resolved. Many trade-offs were required. But it is this Office's position that each trade-off has been arrived at in a justifiable manner and based upon an exceptional regard for possible environmental implications.

Attached is the Water Quality Certification for this project, issued by the Division of Water Pollution Control. Though written prior to the latest revision of the parameters of the disposal site and weir location, the Division has determined that a new Certification will not be necessary. The Division requires that leachate be monitored and notes that should any violation of water quality standards occur as a result of this project, the Division reserves the right to revoke the certification.

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Attached also is a copy of the write-off letter from the Massachusetts Historical Commission which requests as conditions to their sign-off:

(1) that a certain area of the disposal site be avoided, so that neither the dumping of dredge spoils nor any construction activity shall take place on that site;

(2) that the existing dike near the area to be avoided be used as a guide for the new and higher dike;

(3) that the dike be impervious to avoid leaching into the sensitive area; and

(4) that the Corps avoid further publicity concerning that site.

In addition, the MHC requests the opportunity to review and comment upon final construction plans and specifications for this project.

The Division of Marine Fisheries and the Division of Fisheries and Wildlife, while indicating a number of concerns over the disposal location, timing of dredging, and the effect of turbidity plumes associated with the dredging and disposal activities, have reached agreement and have set the following conditions upon the project:

(1) Since extensive quahog beds exist in the subtidal areas adjacent to the spoil site, discharge could have an adverse effect on shellfish spawning and settling. Therefore, the discharge pipe from the disposal area should extend to the navigation channel or beyond the shellfish beds.

(2) In order to avoid the downstream migration of juvenile alewife, dredging should not take place during September and October.

(3) Since it appears impossible to avoid dredging during the period of upstream migration of spawning adult alewives, between March 15th and May 31st, appropriate engineering mitigatings are required. Since dredging will be by hydraulic means, most turbidity problems will be avoided at the dredging sites. In order to minimize turbidity impacts at the disposal site, the effluent pipe which is being placed out into the river should be tilted downward at its outfall location to the extent necessary in order to ensure that the water closest the surface shall be turbidity-free to a depth of 15 feet. Also, provision shall be made that should the turbidity plume be determined to cover more than 40% of the width of the channel at any time during the period of March 15-May 31, the project shall be shut down for the duration of that period. The Commonwealth will make an attempt to provide some sort of fish tagging study in association with this project in order to provide some data for future use in understanding behavioral effects on alewife from turbidity.

Yet to be concluded are two areas of concern. Arrangements are being made for the Somerset Conservation Commission to review the most recent revisions in the proposal for the disposal site. Several items will need to be addressed, such as the change in disposal area size, weir location, dike height, the need to truck in diking material from off-site, and the change in anticipated dates of project construction. The Conservation Commission has been forewarned of these changes and no problems are anticipated.

The last issue is primarily a financial and legal one. Negotiations are currently being conducted by the Secretary of Environmental Affairs' legal counsel, Michael Ventresca, in order to work out agreements in contract wording for responsibilities and obligations associated with the use of the disposal site, dike construction, and maintenance of the disposal area upon the project's completion. One issue apparently resolved is the allocation of diking costs to private parties who will be dredging concurrently with the Corps and using the same disposal site. Apparently, suitable diking material has been located on property owned by New England Power Company, which the company will donate to the project. Thus, costs to private dredging parties for their share in the construction of the disposal dike will be substantially reduced from the $ 42,000 originally estimated in your letter of June 29, 1978. I hope to see the other contract issues resolved very quickly in as amicable a fashion so that written assurances can be made to you of the extent of the participation of the state and private dredging parties involved in this project.

Sincerely,

Eric E. Van Loon
Director
Coastal Zone Management

EVL:SRA:sar

cc: U.S. Fish and Wildlife Service
Environmental Protection Agency
National Marine Fisheries Service
Dredge Reviewers
Mass. Historical Commission
Somerset Conservation Commission

March 31, 1978

V. L. Andreliunas, Chief
Operations Division
New England Division,
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Re: Water Quality Certification
Maintenance Dredging
Fall River Harbor

Dear Mr. Andreliunas:

In response to your request in letter dated January 16, 1978, this Division has reviewed your proposal to perform maintenance dredging in Fall River Harbor.

It is my understanding that the Federal maintenance dredging will be restricted to the 35-foot turning basin in the Taunton River where preliminary estimates indicate a need to remove approximately 118,000 cubic yards of sediment. Enclosed with your letter were a location map (INCL. 1) showing the dredging and disposal areas and a detailed map (INCL. 2) of the disposal area. Also enclosed for our review were the bulk analyses of the sediments and an evaluation of those findings.

In addition to the Federal work, several berthing areas, namely those of Montaup (40,000 c.y.), New England Power Company (10,000 c.y.) and the State Pier (20,000 c.y.) are scheduled for dredging with disposal within the same site. These concerns will presumably negotiate with the Corps' contractor following completion of the Federal work.

The dredging will be done hydraulically and the sediment will be pumped via pipeline to the upland disposal site. The dredged material will be contained within the 17-acre site by dikes that will be constructed on the north, east and south sides of the area. An abandoned railroad track bed will confine the dredged sediment along the west limit of the site. No sections of the Montaup property beyond the limits of the disposal area will be disturbed

during dike construction as these sections have been identified as valuable wildlife habitat. Material used to construct the dikes will be excavated from within the disposal area and all construction equipment will be required to enter and exit the area from the railroad bed.

Sediment will be pumped into the area from the northeast corner and the effluent will be drained off over a weir structure located on the eastern dike, from which point the effluent will be piped out into the river to mitigate any turbidity effects on shellfish in shallow water beds near the disposal area. It is understood that the portion of the area shaded in red on the disposal area map was previously used to dispose of dredged material and the remaining portion, shaded in yellow, has not previously been disposed on. These two areas are separated by the old disposal area dike which will be built up to act as a baffle to increase the retention time of dredged slurry in the area and facilitate sedimentation.

In accordance with the provisions of Section 401 of the Federal Clean Water Act of 1977 (Public Law 95-217), this Division hereby issues the following Water Quality Certification relative to this project:

1. The dredging portion of the project could result in a violation of water quality standards adopted by this Division. Therefore, reasonable care and diligence shall be taken by the contractor to assure that the proposed activity will be conducted in a manner which will minimize violations of said standards.
2. Disposal of the dredged material shall be accomplished substantially as outlined in your letter of January 16, 1978 and depicted on the attachments thereto. Consideration shall be given to:
    a. Institution of a program of monitoring to evaluate the effect of any leachate on the receiving water:
    b. Furnishing details of the spoil dike, the effluent weir, and the effluent disposal pipe.

Should any violation of the water quality standards or the terms of this certification occur as a result of the proposed activity, the Division will direct that the condition be corrected. Non-compliance on the part of the permittee will be cause for this Division

to recommend the revocation of the permit(s) issued therefor or to take such other action as is authorized by the General Laws of the Commonwealth.

Very truly yours,

Thomas C. McMahon
Director

TCM/WAS/bc
cc: David Standley, Commissioner, Department of Environmental Quality Engineering
Evelyn F. Murphy, Secretary, Executive Office of Environmental Affairs, 100 Cambridge Street, Boston, Mass. 02202
Richard E. Kendall, Commissioner, Dept. of Environmental Management
Allen E. Peterson, Jr., Director, Division of Marine Fisheries
Matthew Connally, Jr., Director, Division of Fisheries and Wildlife
Anthony Cortese, Director, Division of Air & Hazardous Materials
John J. Hannon, Director, Division of Land & Water Use

Fall R. Co.

Town of Somerset
Conservation Commission

ORDER

WETLAND PROTECTION ACT

G.L. C. 131 s. 40

FILE NUMBER 70-24

TO : Montaup Electric Company
Riverside Avenue
Somerset, Mass. 02726

RE: Notice of Intent and Plans dated Dec. 8,1977

Date of Public Hearing:
January 9, 1978

Project location: A 17 acre area north of Brage Bridge along the Taunton River, east of the former railroad bed, and south of the Somerset Sewer Treatment Plant.

Date of Receipt by Conservation Commission: December 12, 1977

Pursuant to the authority of G.L. C. 131 s. 40, the SOMERSET CONSERVATION COMMISSION has considered your notice of intent and plans submitted therewith, and has determined that the area on which the proposed work is to be done is significant to one or more of the interests described in the said act. The SOMERSET CONSERVATION COMMISSION hereby orders that the following conditions are necessary and all work must be performed in strict accordance with said conditions and with the Notice of Intent and Plans, unless modified by said conditions:

CONDITIONS

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this order.

2. This order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.

3. This order does not relieve the permittees or any other person of the necessity of complying with all other applicable federal, state or local statutes, ordinances, by-laws and/or regulations.

4. The work authorized hereunder shall be completed within one (1) year from the date of this order unless otherwise stated below pursuant to Regulation 6.7. The order may be extended by the issuing authority for one or more additional one-year periods upon application to the said issuing authority at least thirty days prior to the expiration date of the order or its extension.

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5. Any fill used in connection with this project shall be clean fill, containing no trash, refuse, rubbish or debris, including, without limiting the generality of the foregoing, lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles or parts of any or the foregoing.

6. No work may be commenced until all appeal periods have elapsed from the order of the Conservation Commission or from a final order by the Department of Environmental Quality Engineering.

7. No work shall be undertaken until the final Order, with respect to the proposed project, has been recorded in the Registry of Deeds for the district in which the land is located within the chain of title of the affected property. Copy to be furnished to issuer of this Order showing book and page prior to commencement of work.

8. Upon completion of the work described herein, the applicant shall forthwith request, in writing, that a Certificate of Compliance be issued stating that the work has been satisfactorily completed.

9. A sign shall be displayed at the site not less than two square feet or more than three square feet bearing the words "Massachusetts Department of Environmental Quality Engineering. Number 70-24."

0. Where the Department of Environmental Quality Engineering is requested to make a determination and to issue a superseding order the Conservation Commission shall be a party to all agency proceedings and hearings before the Department.

.1. A Corps of Engineers inspector must be present during the disposal of dredge materials from the private portion of the dredging project and also for the Corps of Engineers portion of said project.

.2. As indicated on map "Topographic Plan of Land, MONTAUP ELECTRIC COMPANY, Taunton River, Somerset, Massachusetts, June 23, 1977, Cullinan Engineering Co. Inc." no work or activity concernig said project shall take place beyond 75 feet south of downstream dike, (southern dike).

.3. The location of discharge weir shall be as shown on map cited above.

.4. The location of nothern dike shall be placed at least 75 feet south of stream which exists in that area.

.5. Proper measures shall be taken to prevent the blowing of dust from the dredged materials.

.6. Good and proper engineering practices shall be followed at all phases of the project.

CONDITIONS CONTINUED PAGE 3 FILE NO. 70-24

The applicant, any person aggrieved by this order, any owner of land abutting the land upon which the proposed work is to be done, or any ten residents of the town in which such land is located, are hereby notified of their right to appeal this order to the Department of Environmental Quality Engineering provided the request is made in writing and by certified mail to the Department within ten (10) days from the issuance of this order.

ISSUED BY THE SOMERSET CONSERVATION COMMISSION

_____ Chairman

_____ Secretary

_____ Member

_____

_____

January 28, 1978

On this 31st day of January 1978, before me personally appeared HARRY A. JOHNSON to me known to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same as his free act and deed.

_____ My Commission expires _____

Rec'd FEB 1 3 1978 AT 2:00 PM AND RECORDED

A TRUE COPY OF INSTRUMENT AS RECORDED IN BRISTOL COUNTY FALL RIVER DISTRICT REGISTRY OF DEEDS IN BOOK 1211 PAGE 5 16-18 INC.
ATTEST:

A-24

REGISTER

Appendix B

Plants identified in and around the proposed dredged material disposal area in Somerset, Massachusetts.

Nomenclature and phylogenetic order according to Fernald (1970).

Fernald, M.L. 1970. Gray's Manual of Botany. (8th ed.) D. Van Nostrand Co. 1632 pp.

Osmundaceae (Flowering Fern Family)

Cinnamon Fern (*Osmunda cinnamomea* L.)

Polypodiaceae (Fern Family)

Sensitive Fern (*Onoclea sensibilis* L.)

Marsh Fern (*Dryopteris thelypteris* (L.) Gray)

Pinaceae (Pine Family)

Red Cedar (*Juniperus virginiana* L.)

Typhaceae (Cattail Family)

Common Cattail (*Typha latifolia* L.)

Narrow-leaved Cattail (*T. angustifolia* L.)

Gramineae (Grass Family)

Downy Chess (Bromns tectorum L.)

Fescue, unidentified (Festuca sp.)

Meadow-grass, unidentified (Poa sp.)

Ochard-grass (Dactylis glomerata L.)

Spike Grass (Distichlis spicata (L.) Greene)

Common Reed (Phragmites communis Trin.)

Poverty Oat-grass (Danthonia spicata (L.) Beauv.)

Beachgrass (Ammophila breviligulata Fern)

Redtop (Agrostis alba L.)

Timothy (Phleum pratense L.)

Freshwater Cordgrass (Spartina pectinata Link)

Saltwater Cordgrass (S. alteniflora Loisel.)

Saltmeadow Grass (S. patens (ait.) Muhl.)

Panic Grasses, unidentified (Panicum spp.)

Grasses, unidentified (Gramineae)

Cyperaceae (Sedge Family)

Spikerush (Eleocharis sp.)

Bulrush (Scirpus sp.)

Sedges, unidentified (Carex spp.)

Juncaceae (Rush Family)

Black Grass (Juncus gerardi Loisel.)

Soft Rush (J. effusus L.)

Liliaceae (Lily Family)

Day Lily (Hemerocallis fulva L.)

Common Greenbriar (Smilax rotundifolia L.)

Iridaceae (Iris Family)

Stout Blue-eyed Grass (Sisyrinchium angustifolium Mill.)

Salicaceae (Willow Family)

Black Willow (Salix nigra Marsh.)

Willows, unidentified (S. spp.)

Quaking Aspen (Populus tremuloides Michx.)

Bigtooth Aspen (P. grandidentata Michx.)

Myricaceae (Wax-Myrtle Family)

Sweet Gale (Myrica gale L.)

Bayberry (M. pensylvanica Loisel.)

Corylaceae (Hazel Family)

Gray Birch (Betula populifolia Marsh.)

Alder (Alnus sp.)

Fagaceae (Beech Family)

Black Oak (Quercus velutina Lam.)

Ulmaceae (Elm Family)

Dwarf Hackberry (Celtis occidentalis var. pumila (Pursh) Gray)

Polygonaceae (Buckwheat Family)

Curly Dock (*Rumex crispus* L.)

Sheep Sorrel (*Rumex acetosella* L.)

Chenopodiaceae (Goosefoot Family)

Lamb's-quarters (*Chenopodium album* L.)

Glasswort (*Salicornia* sp.)

Caryophyllaceae (Pink Family)

Lesser Stitchwort (*Stellaria graminea* L.)

Evening Lychnis (*Lychnis alba* Mill.)

Bouncing Bet (*Saponaria officinalis* L.)

Ranunculaceae (Crowfoot Family)

Buttercup (*Ranunculus* sp.)

Meadow Rue (*Thalictrum* sp.)

Cruciferae (Mustard Family)

Peppergrass (*Lepidium virginicum* L.)

Common Wintercress (*Barbarea vulgaris* R. Br.)

Rosaceae (Rose Family)

Meadowsweet (*Spiraea latifolia* (Ait.) Borkh.)

Steeplebush (*S. tomentosa* L.)

Pear (*Pyrus communis* L.)

Apple (P. malus L.)

Red Chokeberry (P. arbutifolia (L.) L.f.)

Smooth Shadbush (Amelanchier laevis Wieg.)

Rough Cinquefoil (Potentilla recta L.)

Dwarf Cinquefoil (P. canadensis L.)

White Avens (Geum canadense Jacq.)

Black Raspberry (Rubus occidentalis L.)

Blackberry (R. sp.)

Dewberry (R. flagellaris Willd.)

Multiflora Rose (Rosa multiflora thunb)

Pasture Rose (R. carolina L.)

Black Cherry (Prunus serotina Ehrh.)

Leguminosae (Pea Family)

Red Clover (Trifolium pratense L.)

White Sweet Clover (Melilotus alba Desr.)

Round-headed Bush Clover (Lespedeza capitata Michx.)

Cow Vetch (Vicia cracca L.)

Slender Vetch (Vicia tetrasperma (L.) Moench.)

Beach Pea (Lathyrus japonicus Willd.)

Oxalidaceae (Wood Sorrel Family)

Wood Sorrel (Oxalis sp.)

Anacardiaceae (Cashew Family)

Staghorn Sumac (Rhus typhina L.)

Smooth Sumac (R. glaba L.)

Dwarf Sumac (R. copallina L.)

Poison Ivy (R. radicans L.)

Celastraceae (Staff Tree Family)

Wahoo (Euonymus atropurpureus Jacq.)

Aceraceae (Maple Family)

Norway Maple (Acer plantanoides L.)

Red Maple (A. rubrum L.)

Box Elder (A. negundo L.)

Balsamaceae (Touch-me-not Family)

Spotted Touch-me-not (Impatiens capensis Meerb.)

Vitaceae (Vine Family)

Virginia Creeper (Parthenocissus quinquefolia (L.) Planch.)

Grape (Vitis sp.)

Guttiferae (St. Johnswort Family)

Common St. Johnswort (Hypericum perfortum L.)

Spotted St. Johnswort (H. punctatum Lam.)

Elaeagnaceae (Oleaster Family)

Russian Olive (Elaeagnus angustifolia L.)

Onagraceae (Evening Primrose Family)

Common Evening Primrose (Oenothera biennis L.)

Umbelliferae (Parsley Family)

Wild Carrot (Daucus carota L.)

Cornaceae (Dogwood Family)

Swamp Dogwood (Cornus amomum Mill.)

Ericaceae (Heath Family)

Highbush Blueberry (Vaccinium corybosum L.)

Primulaceae (Primrose Family)

Yellow Loosestrife (Lysimachia terrestris (L.) BSP.)

Apocynaceae (Dogbane Family)

Spreading Dogbane (Apocynum androsaemifolium L.)

Asclepiadaceae (Milkweed Family)

Common Milkweed (Asclepias syriaca L.)

Convolvulaceae (Morning Glory Family)

Hedge Bindweed (Convolvulus sepium L.)

Scrophulariaceae (Figwort Family)

Common Mutlein (Verbascum thapsus L.)

Moth Mullein (V. blattaria L.)

Butter-and-eggs (Linaria vulgaris Hill)

Caprifoliaceae (Honeysuckle Family)

Japanese Honeysuckle (Lonicera japonica thunb.)

Arrowwood (Vibernum recognitum Fern.)

Common Elder (Sambucus canadensis L.)

Cucurbitaceae (Gourd Family)

Wild Cucumber (Echinocystis lobata (Michx.) T.&G.)

Campanulaceae (Bluebell Family)

Venus's Looking-glass (Specularia perfoliata (L.) A.DC.)

Brook Lobelia (Lobelia Kalmii L.)

Compositae (Composite Family)

Thoroughwort (Eupatorium sp.)

Seaside Goldenrod (Solidago sempervirens L.)

Goldenrod (Solidago spp.)

Daisy Fleabane (Erigeron strigosus Muhl.)

Marestail (*E. canadensis* L.)

Common Ragweed (*Ambrosia artemisiifolia* L.)

Cocklebur (*Xanthium* sp.)

Bur Marigold (*Bidens* sp.)

Yarrow (*Achillea millefolium* L.)

Ox-eye Daisy (*Chrysanthemum leucanthemum* L.)

Chicory (*Cichorium intybus* L.)

Yellow Goatsbeard (*Tragopogon pratensis* L.)

Hawkweed (*Hiercium* sp.)

Appendix C

Some birds and mammals observed in and around proposed dredged material disposal area in Somerset, Massachusetts.

Yellowthroat	Geothlypis trichas
Yellow Warbler	Dendroica petechia
Gold finch	Spinus tristus
Song Sparrow	Melospiza melodia
Redwing Blackbird	Agelaius phoeniceus
Bluejay	Cyanocitta cristata
Crow (Common)	Corvus brachyrhynchos
Mockingbird	Mimus polyglottus
Starling	Sturnus vulgaris
Mourning Dove	Zenaida asiatica
Pheasant (Ring-necked)	Phasianus colchicus
Black Duck	Anas rubripes
Mallard Duck	Anas platyrynchos
Cardinal	Richmondena cardinalis
Robin	Turdus migratorius
Cedar Waxwing	Bombycilla cedrorum
Barred Owl	Strix varia
Field Sparrow	Spizella pusilla

Mammals

Muskrat	Ondatra zibethica
Woodchuck	Marmota monax
New England Cottontail	Syluilagus palustris

Table 1. Corps of Engineers' analysis of Sediment Samples collected near the Brightan Street Bridge, Taunton River Shipping Channel 1972; metal levels in ppm dry weight for surface (2") and surface (12"-14") samples; Data from: Fall River DEIS.

Sample Number	Volatile Solids (%)	Kjeldahl Nitrogen (%)	Hexane Soluble (%)	Silt/ Clay (%)	Hg	Pb	Zn	Cu	Cd	Cr	PFB DDT	PFB PCB
				1972 Data								
1	3.02	0.08	0.050	69	0.93	98.0	626.0	45.0	1.2	26.0		
					0.05	18.0	46.0	24.0	0.6	10.8		
2	10.20	0.45	0.615	98	4.69	146.0	334.0	213.0	2.4	407.0		
					5.51	190.0	278.0	234.0	1.4	448.0		
3	10.03	0.33	0.617	97	3.61	167.0	361.0	152.0	2.1	351.0		
					5.26	175.0	329.0	192.0	1.1	255.0		
4	8.46	0.27	0.459	93	3.58	426.0	498.0	149.0	2.6	134.0		
					3.09	175.0	728.0	109.0	2.6	119.0		
5	9.38	0.37	0.537	98	3.47	179.0	399.0	213.0	2.1	299.0		
					4.22	201.0	331.0	163.0	2.0	271.0		
6	9.90	0.37	0.663	98	3.65	170.0	359.0	196.0	2.3	354.0		
					3.27	145.0	362.0	150.0	2.1	279.0		
7	7.82	0.25	0.314	94	2.11	179.0	340.0	114.0	3.6	128.0		
					1.86	168.0	329.0	80.0	3.1	105.0		
				1975 Data (Turning Basin Only)								
1	21.9	0.578	-	-	3.1	231.0	339.0	163.0	5.4	672.0	37.0	430.
2	-	-	-	-	4.0	248.0	372.0	161.0	5.0	941.0	-	-
3	24.1	0.412	-	-	3.4	206.0	339.0	121.0	4.9	728.0	-	-

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Table 2 . Concentrations of various contaminants in elutriate samples from sediments collected in the Taunton River Turning Basin in 1975.

Explor No.	PE-1-75	PE-1-75	PE-2-75	PE-2-75	Avg.
Depth	0-2"	12-14"	0-2"	12-14'	
Location					
Sounding (ft)	27.3		28.1		
Date Collected	5059		5050		
Description	blk. org. silt		blk., to dk. grey org. silt		
Nitrite (mg/l)	0.01	0.01	0.01	0.01	0.01
Nitrate (mg/l)	0.1	0.1	0.1	0.1	0.1
Freon Soluble (mg/l)	1.8	0.0	0.0	0.0	0.45
Phosphorus					
Ortho (mg/l)	0.033	0.01	0.01	0.067	0.03
Total (mg/l)	0.095	0.050	0.055	0.127	0.08
Mercury (ug/l)	0.4	0.0	0.0	0.3	0.17
Lead (ug/l)	4	4	4	17	7.25
Zinc (ug/l)	5	15	5	6	7.75
Arsenic (ug/l)	11	14	3	9	9.25
Cadmium (ug/l)	1	1	1	1	1
Chromium (ug/l)	5	5	5	5	5
Copper (ug/l)	4	15	4	7	7.5
Nickel (ug/l)	5	7	15	5	8.0
Vanadium (g/l)	10	10	10	10	10

APPENDIX D
Expected Types and Magnitude of Aquatic Contamination

Types of Contamination Expected

In general, the primary types of dredging-related contamination of potential hazard to an aquatic regime result from release of excessive organic material, nutrients, chlorinated hydrocarbons, and heavy or trace metals. Table 1 summarizes some of the concentrations of these contaminants in sediments collected near the Brighton Street Bridge in 1972 and in 1975.

The presence of contaminants in the sediments does not necessarily infer their release into the water. For this reason, an elutriate test has been performed to simulate mixing of sediments with water and measure the potential release of contaminants from sediments into the water. Elutriate test results from sediments collected from the turning basin in the Taunton River are given in Table 2. As the test results indicate, heavy metal concentrations in the elutriate were not particularly high, even though concentrations were high in the sediments. The finer grained the sediments, the more adsorption of trace elements and compounds.

Another (and perhaps more likely) pollutant that may result, particularly from the land disposal effluent, is an increased Biological Oxygen Demand (BOD). The BOD indicates the degree of potential oxygen consumption through bacterial decomposition of organic material in the water. A high BOD will usually result in decreased oxygen levels, and subsequent stress on aquatic fauna. Oxygen is a vitally important substance in water; without it at sufficient concentrations, many kinds of aquatic organisms cannot exist.

Many "fish kills" result, not from direct toxicity of pollutants, but rather from the lack of oxygen because of excessive oxygen consumption by the biodegradation of organic pollutants.

BOD can increase to hazardous levels, not only by direct introduction of organic contaminants into the water, but also from unstable algal growth resulting from the introduction of excessive nutrients into the water from the sediments. When the algae die, the degradation of their biomass consumes oxygen.

Expected Magnitude of Contamination

Because of the method of dredging (hydraulic, with pipeline disposal) relatively little dispersion of the sediments would occur at the dredging or disposal sites. Turbidity will be short term, and diffused by local currents to the extent that concentrations of contaminant dissolution will probably be insignificant. In fact, the effects of dredging itself should be no more intense than those caused by the continuous disruption of bottom sediments by the screws of large ocean going craft commonly using the channel and turning basin; particularly in view of the decreasing depths in the navigable portions of the river.

Because of the high amount of sediment-water admixture by the dredge, the prolonged period of confined exposure of dredged materials to a limited water supply, and the likely chemical change that will take place in the disposal site water, the potential for pollution from the disposal area effluent is probably as much or more likely than at the dredging site directly. However, necessary studies have been lacking to make accurate predictions on the nature or magnitude of pollution from a dredge material land disposal site. This is primarily because of the unpredictable dynamics of the disposed material and concommitant variability in the quality of the water. Some of the contamination that we can expect, based on presently available evidence, include:

1. An immediate increase in nutrients and subsequent gradual increase in BOD.

2. A decrease in dissolved oxygen; and,

3. A variable change in the concentration of heavy and trace metals.

The possibility of these types of effects is high, and such impacts can be hazardous to an aquatic system. However, the quantity of the effluent containing such pollution is small in proportion to the entire Taunton River - Mount Hope Bay region, and it is therefore doubtful that any detrimental impacts, except in a small area nearby the effluent, would occur. The effluent would be piped to a point in the River where currents will disperse and diffuse the contaminants found in the effluent. Beyond the immediate vicinity of the discharge point, dilution of the effluent will likely reduce impacts to an insignificant magnitude.

Any potential impacts, particularly from decreased oxygen supplies, would be greatest during warmer months when oxygen is more in demand, and during spawning seasons, particularly of an anadromous species, when large quantities of fish and less pollution tolerant eggs and larval forms will be present in the rivers and bays.

Appendix E

DEFINITIONS OF TERMS

The following terms are defined in the perspective of this evaluation.

Benthic. Of, relating to, or occurring at the bottom of a body of water.

Biological Oxygen Demand. The oxygen used in meeting the needs of aerobic microorganisms in water rich in organic matter.

Constituents*. Chemical substances, solids, and organisms associated with dredged or fill material.

Contaminant. Something that, when introduced into an environment, creates undesirable reactions.

Discharge of Fill Material*. The addition of fill material into navigable waters for the purposes of creating...(among other things) impoundments of water. The term generally includes...dams and dikes.

Fill Material*. Any pollutant used to create fill in the traditional sense of replacing an aquatic area with dry land or of changing the bottom elevation of a body of water for any purpose.

Mitigate. To cause to become less harsh or hostile; to make less severe or pairful; alleviate.

Navigable waters*. Generally, up to the high water mark of any U. S. waters greater than 5 cfs average flow, and any water resources contiguous to such waters including, but not restricted to lakes, ponds, wetlands, and intermittent streams.

Nekton. Free swimming aquatic animals essentially independent of wave and current action.

Plankton. The passively floating or weakly swimming, usually minute animal and plant life of a body of water.

Riparian. Related to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.

Wetlands*. Those areas that are periodically inundated and that are normally characterized by the prevalence of vegetation that requires saturated soil conditions for growth and reproduction.

* Definitions from 40 CFR 230 (EPA Guidelines App. A).